# ENTOMOLOGICAL NEWS

**JUNE 1949**

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# ENTOMOLOGICAL NEWS

VOL. LX JUNE, 1949 No. 6

## Fleas of the Sagebrush Meadow Mouse

By C. ANDRESEN HUBBARD, Vanport College, Portland 3, Oregon

The sagebrush meadow mouse, *Lagurus curtatus pauperrimus,* has been one of the rare mice of North America even in museum collections. During 1948, two naturalists of the State of Washington, Dr. C. Wesley Clanton of the Washington State Department of Health and Dr. Murray Johnson, Surgeon of Tacoma, Washington working on plague investigation in central Washington uncovered ranges where these rare mice were taken by the hundreds. Samplings of their fleas were sent to the writer for determination. The great bulk of these were two entirely new insects, and are described herewith, each bearing the name of one of the above investigators. The type locality in each case is Davenport, Lincoln County, Washington, the type host the sagebrush meadow mouse. Because there are large numbers of these fleas before the writer at this time types are deposited in the Academy of Natural Science of Philadelphia, the U. S. National Museum, the British Museum and in 20 other depositories maintained by the writer. The holotype male and allotype female in each case, mounted on a single slide and bearing the writer's number 2700 and dated May 15, 1949, have been sent to the National Museum.

**Megabothris clantoni** new species

The new species is close to *Megabothris abantis* (Roths.) from which it differs in the male by the shape and armature of the finger. Whereas the finger of *abantis* is somewhat rectangular with long, posterior face undulant, in *clantoni* the finger is ham-shaped, the shank portion between long spiniform and

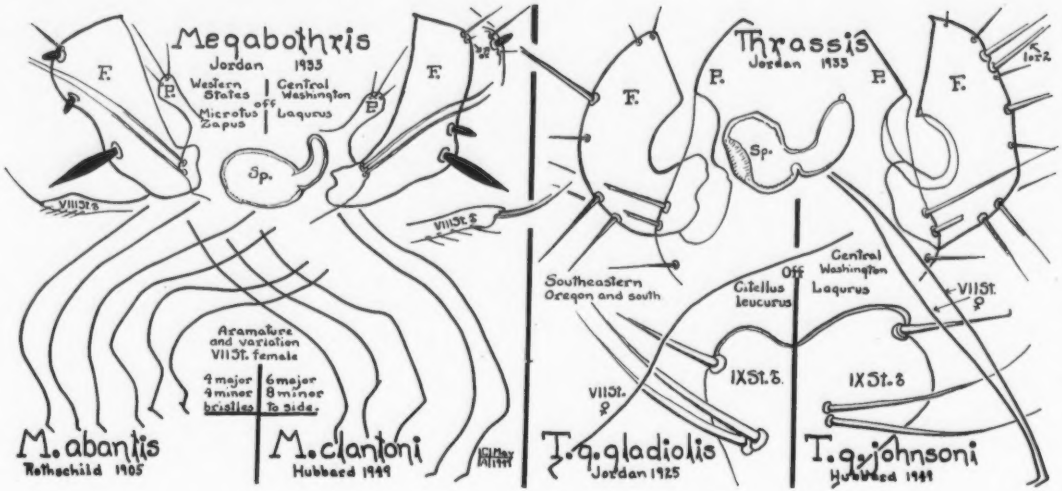


FIG. 1. *Megabothris abantis, M. clantoni, Thrassis gladiolis gladiolis, T. g. johnsoni.*

articulation with process as long as the portion of finger above long spiniform. Armature in *abantis* a lower long pointed spiniform, then above it about equally spaced two much shorter spiniforms apically rounded, but in *clantoni* this arrangement is changed by having the upper spiniform of *abantis* represented in the majority of cases by a simple small bristle. About 1 out of 20 specimens in *clantoni* have the armature arrangement of *abantis*.

Due to the amount of variation in the apical outline of the VII sternite of the female in both *abantis* and *clantoni* it is difficult to distinguish one from the other. This outline in *clantoni* is with upper lobe which varies from well rounded to angulate. The outline of the allotype is with upper lobe with flat surface, lower angle angulate, upper angle rounded. The spermatheca is barrel shaped, with crooked finger shaped appendix but without appendage.

The new flea measures 2.00 mm. in male, 2.75 mm. in female.

Remarks: As early as June 16, 1938 the writer took the female of this flea off Lagurus at Bickleton, Washington but mistook the specimens for *M. abantis*. Specimens coming to him from Clanton have been in the ratio of 5 females to 1 male. These fleas have proved plague positive in parts of central Washington. From February through June at least the flea count on these mice is very high.

**Thrassis gladiolis johnsoni** new subspecies

The new subspecies is close to *Thrassis gladiolis gladiolis* which ranges some 300 miles to the south in southeastern Oregon. The writer has no evidence that the range of the two fleas comes closer. The chief difference between the males of *Thrassis g. gladiolis* and *Thrassis g. johnsoni* is the very prominent IX sternite in the new form which if one were to state it in the vernacular "sticks out like a sore thumb." The finger of *johnsoni* is of the general shape of *gladiolis* but the armature is somewhat different, being of 5 major bristles along the posterior border, the two uppermost very long and fairly close together. Midway down the border is a major bristle, which may be directed

downwards. At the lower angle of the border are the usual 2 Thrassis spike-like bristles. The VIII sternite is apically angulate rather than rounded as in other *gladiolis*. The IX sternite sets well out beyond the other modified segments. The apical bristle is not so spine-like and the customary paired bristles below the apex are grass-blade-like.

In the apical outline of the VII sternite of the female the undulation found in the females of other *gladiolis* is missing. The outline, if not damaged, is nicely rounded. The armature consists of 5 stout bristles. The spermatheca is typically Thrassis.

In length these fleas measure 1.50 mm. in male and 2.00 mm. in female.

Other interesting data in this study were the rarity of fleas other than *Megabothris clantoni* and *Thrassis gladiolis johnsoni* on Lagurus. In some 500 fleas checked the writer found only 4 males of *Malaraeus telchinum* (Roths.), a deer mouse flea, 1 male and 3 females of *Catallagia decipiens* (Roths.), a mouse flea and 1 male and 2 females of *Meringis shannoni* (Jordan), a pocket mouse flea. Clanton took 11 specimens of *Rattus norvegicus* as Odessa, Lincoln County, Washington which carried amongst other fleas 1 male and 2 females of *Megabothris clantoni* and a female of *Thrassis gladiolis johnsoni*.

## Personal

Doctor **H. B. Hungerford** has retired as head of the Department of Entomology of the University of Kansas. He will continue his teaching, both at the University of Kansas and, during summer months, at the University of Michigan Biological Station. He expects to continue his research program on the aquatic Hemiptera. Having recently published a revision of the Corixidae of the Western Hemisphere, he plans to complete his study of the Corixidae of the Eastern Hemisphere.

He is replaced as chairman of the Department of Entomology by Doctor Charles D. Michener, who is continuing studies now in progress on the saturniid moths and plans to continue his principal research studies in the taxonomy, evolution, biology and behavior of bees.

## Agrion versus Calopteryx

The NEWS presents below two letters that were received recently from England by its Editor Emeritus, Dr. Philip P. Calvert, and that comment upon the article "Calopteryx versus Agrion; Again?" by Dr. Erich Schmidt, published in ENTOMOLOGICAL NEWS for October 1948, pp. 197–206. Following these, there is a reply to Miss Longfield by Dr. Schmidt, and also parts of Dr. Calvert's letter to Miss Longfield that bear on the same subject.

*British Museum (Natural History)*
*Cromwell Road, London, S.W. 7*

How exceedingly tiresome of Dr. Erich Schmidt to have again raised this question of "Calopteryx versus Agrion" (ENT. NEWS, 1948, 59:197), and on insufficient knowledge. There is no question of the date of publication of volume 9 of Brewster's Edinburgh Encyclopedia (Part I. Entomology), in which volume is Leach's article on the Class Odonata of Fabricius. We have the volume in this museum and the date of publication is 1815. Stephens' date of 1810 referred to the date of publication of volume I of the Encyclopedia, which is proved by the following reference in Stephens' *Systematic Catalogue of British Insects,* 1829, where on page xxvi, under "Authors quoted," the reference to Leach is as follows: "Leach in Edinburgh Encyclopedia: articles Entomology and Insecta. Edinburgh. 1810, etc. 4to." Probably Leach's MSS. was ready by 1810, but it was not in print for another five years.

Latreille in 1802 (*Hist. nat. gén. Crust. Ins.,* Vol. 3, page 287) gives *virgo* as the "example" for the genus *Agrion* Fabr. Possibly it is this that some authors consider "obscure," but no one can say the same for Latreille's second reference published in 1810 (*Consid. gén. Anim. Crust. Arach. Ins.,* page 434). Here, Latreille gives a list of all the genera in his book, each name followed by that of one species, which he says, p. 421, that he designates as the type. There is not the slightest ambiguity on this occasion, where *virgo* is cited as the type of *Agrion.* Kirby

was absolutely correct in changing the names as he did, in 1890. That both de Selys Longchamps and Dr. Ris disliked the change of names (who does not?), is beside the point. They did not apply to have the law of priority suspended in this case, nor do I see any reason for supposing that the International Commission on Zoological Nomenclature would have interfered with the published fixation of the type of *Agrion* by Latreille.*

Personal opinions of regret at the application of the law of priority get us nowhere. The generic name of *Agrion* for *virgo* has been widely in use for 59 years, whereas *Calopteryx,* it seems, was only generally adopted for 51 years before the publication of Kirby's catalogue. There is, therefore, little difference in the question of "usage." The original fault lay in Burmeister adopting Leach's name instead of Latreille's, in 1839 (Handb. Ent. 2, page 825). The case for *Agrion* versus *Calopteryx* is clearly proved and all Dr. Schmidt's arguments are useless.

CYNTHIA LONGFIELD, F.R.E.S.

*Holywell House, Edington,*
*Bridgewater, Somerset*

Miss Longfield has sent me a copy of her note on the subject of *Agrion* versus *Calopteryx*. At the moment I have not seen the paper by Dr. Schmidt to which she refers, but in the meantime I would like to add the following comments to her letter, with which I am in general agreement:

For those who adhere to the International Rules of Zoological Nomenclature, there can be no doubt that the genotype of *Agrion* Fabricius, 1775, is *Libellula virgo* Linnaeus, 1758, by the earliest designation (Latreille, 1810); consequently *Calopteryx* of authors falls as a synonym of *Agrion.*

The International Commission on Zoological Nomenclature has ruled (in Opinions 11 and 136) that the designations of genotypes by Latreille, 1810 are valid designations when they do not conflict with other requirements of the International Rules.

* The Nomen. Commission's Opinion 11, says these types should be accepted.

*Calepteryx* Leach, 1815, Brewster's *Edinb. Encycl.* 9 (1) : 137 —the date of publication is known to be April 1815 (see Sherborn, 1937, *J. Soc. Bibl. Nat. Hist.* 1 : 112).

The late R. A. Muttkowski seems to have referred the case of *Agrion* versus *Calopteryx* to the International Commission, and quotes their decision in favour of *virgo* as the genotype of *Agrion* (1910, *Bull. publ. Mus. Milwaukee* 1 (1) : 14–15) ; but no Opinion embodying this decision of the Commission has been published. Muttkowski's premisses, however, were not valid, being based on the citation of an *example* † by Latreille, 1803 (1910, *ibid.:* 26), but this was corrected in a subsequent paper (Muttkowski, 1910, *Bull. Wis. Nat. Hist. Soc.* 8: 158) where the then Secretary to the Commission is quoted as showing that it is possible to settle the question of the genotype of *Agrion* (by the designation of Latreille, 1810) without referring the subject to the Commission at all. This no doubt accounts for the Opinion quoted by Muttkowski never having been published by the Commission; it was I assume withdrawn before publication as being unnecessary.

J. Cowley

*Mozartstrasse 22.*
*(22) Bonn am Rhein,*

Very probably we should not have touched this stinging nettle of nomenclature if we had known earlier that which Prof. Hedicke of Berlin, formerly a collaborator of the "Nomenclator Zoologicus," of the Prussian Academy of Sciences wrote us concerning the date of publication of Leach's paper in Brewster's Encyclopedia, stated by C. D. Sherborn with superexactness and published in his "Index Animalium." According to

† Mention of a species as an example of a genus does not constitute a selection of a type (International Rules, Art. 30 II g). This excludes Latreille, 1803 (the correct date is [1802–1803], for which see Griffin, 1938, *J. Soc. Bibl. nat. Hist.* 1: 157).

There is no warrant for emending Leach's original spelling *Calepteryx*, for he gives no derivation for the name, nor is one obvious from his remarks. From his statement that "This genus comprehends those *Agrionida* with coloured wings" it is only a probability, not a certainty, that he intended the name to be based on καλλι- or καλός and πτέρυξ.

Hedicke, the matter is more complicated than was mentioned in the foregoing article (Miss Longfield's), the most valuable contribution of which is the statement of the probability that Leach's manuscript was ready by 1810.

Now we are not sorry for having written the article, since a further study of the matter brings out other interesting facts that might easily be overlooked. We know of Kirby's error in establishing his "ultra-radical" change of names on the basis of Latreille's paper of 1802, and now we know also, and well, that the later paper of 1810 is in no way better! In a footnote in Trans. VII Int. Congr. Ent., Berlin, p. 559, and in more minute detail in Entom. Rundschau 56, 1939, p. 187 ff., it is stated that Latreille sometimes gave two species names as "types" for one genus, which certainly does not conform to our modern idea of "genotype." For this reason there arises not only a "slightest ambiguity" but a really decided one concerning Kirby's change of name, and he is "absolutely incorrect" in the same manner as the writer of the foregoing article and the modern anachronists such as Muttkowski, Stiles and Cowley. The International Congress of Zoology in Lisbon (1935), however, took the first step in a retreat when it limited the application of its former decision to only those genera of Latreille (1810) that have only one species name as the "type." However, since the foregoing reflections will be valid generally, from a logical point of view, for all of Latreille's genera in his paper of 1810, we may expect that even the God-like International Commission of Zoological Nomenclature will, although perhaps only after a period of reflection, arrive at the next step (a necessary conclusion), the entire "suspension" of its somewhat superficially made Opinion 11, an opinion that originated during a period when that honorable group was made up preponderantly of "rigorists of priority." *

* I should like also to call attention to the following: In comparing the time in years during which the two names were in general use, Miss Longfield overlooks the fact that for a long time after the appearance of Kirby's catalogue no attention was paid to the change in name, not even in England. The outstanding authorities there, such as McLachlan and K. J. Morton used *Calopteryx* all their lives, ignoring Kirby, just as did

To date, this is still only a dream of the future. However, the present generation has a duty to establish an accord in nomenclature as soon as possible, and the writer believes that the path of "classical nomenclature" will always be better than any other, especially for the younger generation, in order to prevent, in the end, football versus entmology.

ERICH SCHMIDT

*P. O. Box 14,*
*Cheyney, Pennsylvania.*

A practical consideration also enters into the nomenclatural question of *Calopteryx* versus *Agrion* which I emphasized in my June, 1927, editorial, "Does Familiarity Breed Contempt" (ENT. NEWS 38: 185–6). For some years I have been bringing together notes on papers dealing with the chemical, physical and biological characters of waters in which Odonate larvae (nymphs) live. I have just looked over these notes from authors whose names begin with A—D, who have anything to say on larvae of *Calopteryx* or *Agrion,* with these results (purely systematic papers are not included):

W. J. Lucas together with the entire faunistic literature of England, so that while these authors lived *Calopteryx* was in almost universal use in England, that is up until about 1935. Lucas died in 1932, and Morton in 1940. The first attempts to recognize Kirby (by F. F. Laidlaw in 1902) were very feeble and did not succeed even after the publication of Muttkowski's catalogue (1911). Not until the newer compilations made their appearance as a substitute for Lucas' work, now out of print, was the mistaken change of name actually effected. Moreover, on the continent of Europe (with the exception of Navas, of all people) *Calopteryx* is in almost universal use and always will be. Actually, then, *Calopteryx* has been in general use for about 100 years as contrasted with about 15 years for *Agrion.*

Furthermore, it should be considered, all important monographs, namely those of Selys, Hagen and Bartenef use *Calopteryx,* not *Agrion,* and these have more weight than all modern compilations that have an anachronistic foundation. To be sure, the International Rules have as yet found no adequate means of providing nomenclatorial recognition for the old masters who are not now in a position to defend their life's work against modern anachronism and nonsense. This destruction of old, good names without sufficient reason is, it seems to us, one symptom of the "decline of the West."—ERICH SCHMIDT.

ALI SADE, A. 1934. Trudy Azerbaidzhanskogo Atdelenia etc. 7, Baku. *Agrion* (*Enallagma*) *cyathigerum*, p. 9.
BALDENSPERGER, A. 1927. Bull. Soc. Hist. Nat. Colmar 20. *Agrion, Calopteryx*, pp. 74, 81, 86, 87.
ID. 1929. Op. cit. 21. *Agrion, Calopteryx*, pp. 187, 188, 204, 225, 269.
BARTENEV, A. N. 1930. Rev. Zool. Russe 10(4). *Calopteryx, Agrion*, pp 78, etc.
ID. 1932. Op. cit. 11(1). *Agrion, Calopteryx*, pp. 58, 59.
BERG, K. 1948. Folia Limnol. Scand. 4, Kjobenhavn. *Calopteryx virgo, splendens*, p. 117 etc. According to p. 9, the Odonata were identified by E. W. Kaiser, using J. W. Lucas' Aquatic (Naiad) Stages of British Dragonflies (1930), p 116.
BEYER, H. 1932. Abhandl. westfal. Prov. Mus. Naturk. 3. *Calopteryx, Agrion*, pp. 61, 134.
BOLDYREVA, N. V. 1930. Hydrobiol. Ztschr. USSR. 9. *Agrion*, pp. 60, 80.
BYERS, C. F. 1930. Univ. Florida Publ. Biol. Sci. Ser. *Agrion* (sensu Kirby 1890), p. 265.
CARPENTER, K. C. 1927. Jl. Ecol. 15, Cambridge, Eng. *Agrion pulchellum*, p. 45.
COLLENETTE, C. L. 1944. Entom. 77. *Coenagrion puella*, p. 61.
DECKSBACH, N. K. 1936. Arch. Hydrobiol. 30. *Agrion*, p. 118. Also in Ychene Zapiski Mosk. Gosyd. Yniv. 8. *Agrion*, pp. 86, 111.
DORR, E. 1935. Arch. Hydrobiol. 38(3). *Calopteryx, Agrion*, p. 510.
DORIER, A. & VAILLANT, F. 1948. C. R. Acad. Sci. Paris, 226(15). *Agrion, Calopteryx*, p. 1223.

It will be seen that a majority of these papers use *Calopteryx*, but I am not concerned with determining how large or how small that majority is. What interests me is that many authors still use *Calopteryx*. The conclusion I draw is that, to make one's meaning perfectly clear, it is necessary to specify, in each case where the term *Agrion* is used, just what *Agrion* means in that case. It seems to me to be advisable to use both names in each case in some such way as this: "*Agrion virgo*, also known as *Calopteryx virgo*," *Coenagrion pulchellum*, also known as *Agrion pulchellum*." A very recent example of this practice is in Col. MacNeill's ingenious paper on "Distribution of dragon-

flies in Ireland" in the Irish Naturalists' Journal, ix (9) for January, 1949, pages 234 and 236.

What *Calopteryx* is is known, what *Coenagrion* is is known. *Agrion* is the uncertainty. What an unforgivable crime it would be, from the priorist's point of view, to drop *Agrion* altogether! ! !

PHILIP P. CALVERT

## Oviposition of Cryptocephalus confluens Say (Coleoptera, Chrysomelidae)

By J. W. TILDEN, San Jose, Calif.

On September 26, 1947, a pair of these beetles was taken in copula on a bush of *Baccharis pilularis* D. C. subsp. *consanguinea* D. C. (C. B. Wolf) (Compositae, Astereae), at Page Mill Road, Santa Clara County, California. The pair was brought into the laboratory where the beetles were kept for observation in a large vial of thin glass in which a twig of the food plant was supported by moist sand. This type of container has proven very useful for observational work, since the vial may be placed on its side for use under a binocular microscope without displacing the contents. All of the following observations were made under binocular microscopes of various powers. An effective closure for the vial is formed by loose cotton which allows free exchange of gases and also some humidity control.

For the two days following, the beetles fed on the leaves, cutting scalloped fringes on the leaf edges. On the morning of September 29, the pair was again in copula. The female supports and carries the male during mating. The prothoracic and mesothoracic legs of the male are closely appressed to the elytra of the female. Apparently the setose tarsi of these legs adhere to the elytra of the female, and seem to constitute the only means by which the male remains in position. The metathoracic legs trail. The female controls the entry of the male organ by movements of the terminal sternite of the abdomen. In some instances the male attempted to mate for a period of several

minutes before the female advanced the sternite. The female continues to feed during copulation.

The first egg was found on the bottom of the vial on September 30. The oviposition and subsequent treatment of the egg is peculiar and interesting. The female is equipped with a sulcus on the fifth abdominal sternite which serves, in conjunction with the metathoracic tarsi, to hold the egg. The egg is extruded and is caught by the tips of the tarsi and applied to the sulcus. While the egg is in this position, the female applies a relatively large mass of secretion which forms a mound-like patch on the surface of the egg. The egg is then rotated slightly by means of the tarsi, and another patch of secretion is applied adjoining the first. This process is repeated until the egg is covered with approximately equal rough mounds of this material. The egg is then revolved several times by the tarsi, the legs twitch almost imperceptibly, and the egg, together with its coating, is flipped out and falls to the ground.

The secretion is dull olive in color when first applied, soon darkening nearly to black. After several days, the color changes to a dull brown in the process of drying and remains so without further change. This secreted covering is friable and easily pried away with needles, parting along lines that mark the boundaries of the individual applications. In drying, the coating shrinks away from the egg to some extent, leaving a small space between the coating and the egg; that is, the coating envelopes the egg loosely, the egg being free inside the coating.

The measurements of the case or coating are about 1.5 mm. by 0.9 mm. The egg is smooth, shining, pale in color, without visible sculpture at a magnification of 30 ×, and measures 1.0 mm. by 0.6 mm. in size. The outside measurements of the case are thus 0.5 by 0.3 mm. larger than the egg. The entire structure resembles nothing so much as an old fashioned peanut candy, except for the difference in color.

The process of applying the coating requires about twenty minutes to each egg. After the egg is dropped, the female grooms her appendages carefully and raises and lowers the elytra several times. Occasionally the flight wings are raised and vibrated as though the insect were about to take flight, but

in each case the elytra were lowered again without the insect actually attempting to fly.

The manner of oviposition resembles closely that described by Spruyt [1] for *Saxinis saucia* Leconte, as far as the application of the primary coat is concerned, but this species of *Cryptocephalus*, at least, applies only the one coat and does not apply the eight serrated bands of material described by Spruyt for *saucia*. Neither is the primary layer truncated at one end of the longitudinal axis in *Cryptocephalus*, as described for *Saxinis*. On the contrary, the finished case of *Cryptocephalus* is quite evenly oval in outline.

On September 30, fourteen eggs were laid between 8:00 A.M. and 3:00 P.M., and at 4:30 P.M. the beetles were again in coitu. On October 1, thirteen eggs were laid. On October 2, three eggs were found and the beetles were again seen to mate, at about 4:30 P.M. On October 3, six eggs were laid. No further eggs were found until October 6, when four eggs were laid. On October 8, a single egg was laid, and no further eggs were obtained, although the beetles were found mating on several occasions thereafter.

Observed copulations took place in late afternoon or early evening, whereas oviposition was confined mostly to the morning hours. On October 18, the beetles were preserved as specimens for determination, and since it was desired to keep them as intact as possible for this purpose, no dissection of the female was made, so it is not known if a residuum of unlaid eggs remained. However, the total output of eggs of another species of chrysomelid, *Trirhabda flavolimbata* Mannerheim, the entire life history of which was observed, varied from 43 to 73 eggs over a period of several weeks, so it is barely possible that the forty-one eggs laid by *Cryptocephalus confluens* represent a normal number for the species. Verification of this as fact would require additional observations.

Spruyt (*op. cit.*) found that eggs of *Saxinis saucia* hatched in twenty-six days, but those of *Cryptocephalus* overwintered,

[1] Spruyt, F. J., Observations on the egg-laying habits of *Saxinis saucia* Leconte. Pan-Pacific Entomologist 1 (4): 176–178, 1925.

and had not hatched when the project was abandoned in March, 1948, for other more pressing duties. Although the eggs when discarded appeared to be still viable, no embryos were found in them. This difference in hatching time may be due in part to the season at which the eggs are laid. The eggs of *Saxinis* were laid in July.

The significance of the application of secretions to the eggs is not apparent. Van Dyke [2] describes the rearing of larvae of *Saxinis saucia* from ant nests. Lefroy [3] mentions that larvae of *Cryptocephalus* have been found to be case bearers (as are those of *Saxinis*). However, I have been unable to locate literature stating *Cryptocephalus* to be myrmecophilous, nor have I seen any paper indicating that anyone has seen ants transport to their nests the eggs of known myrmecophilous Chrysomelidae.

The exact origin of the material that forms the case or coating is obscure. At the present time I am unable to say if it is fecal matter or the product of colleterial glands, but the latter explanation seems most reasonable. It seems unlikely that the serrated bands of *Saxinis*, at least, could be formed from fecal matter. Moreover, the true feces excreted by both sexes of *Cryptocephalus* were much less copious than the material that composed the coating. Coleopterists with whom this matter was discussed differed in opinion on this point, which will require additional study to clarify.

## Deaths

**Dr. Filippo Silvestri,** for many years in charge of the Laboratory of Entomology at the Portici Station, and a Corresponding Member of the American Entomological Society, died at Bevagna (Perugia), Italy on June 10.

**Dr. Andrey Avinoff,** a Russian born entomologist who was Director of the Carnegie Museum in Pittsburgh from 1926 to 1945, died in New York City on July 16 at the age of 65.

[2] Van Dyke, E. C., Observations concerning certain Coleoptera from the Yosemite Valley, during the summer of 1921. Pan-Pacific Entomologist 1 (4) : 175–176, 1925.

[3] Lefroy, M. H., Manual of Entomology, with special reference to economic entomology. Edward Arnold & Co., London, 1923 (page 195).

# Preparing Ixodid Ticks for Mounting

By Roland W. Portman; University of Missouri,
Branson, Missouri

Several years ago while attempting to classify some Ixodid ticks that had been preserved in 70 per cent alcohol it was found that some means of straightening their legs away from the body was necessary before all their morphological characteristics could be clearly observed. After the following procedure had been developed, it was discovered that the specimens might be glued on insect pins points for display and study, embedded on slides or mounted in many other ways. Then it was realized that the stretched ticks were wonderful material for the indoors photographer.

It is not known whether the following procedure is entirely original but it seems desirable to describe the technique so that others may be able to take advantage of the method. The materials needed are a supply of ticks, a pair of straight pointed forceps, teasing needle, some microscope slides, some strips of cotton the size of the slides and about one-quarter inch in thickness, some strips of fine sandpaper cut to the same size as the slides, and a few rubber bands.

Select a tick from the supply and grasp the tick with the forceps along the mid-dorso-ventral line, making sure that none of the legs are held under the forceps. With the fingers of the free hand gently stroke and pull the legs laterally and somewhat anteriorly until the muscles have been relaxed or stretched. This may require a little time to break down the muscle tension. When the legs on one side have been relaxed turn the tick over and repeat the procedure with the legs on the other side. This process must be done gently; otherwise the pulvilli will be torn from the tarsi, the legs disjointed or pulled from the body.

When all the legs have been relaxed, place the tick on a strip of sandpaper with the dorsal side up. Then hold the tick against the sandpaper with a teasing needle and arrange the legs in the desired position. The pulvilli will in most cases

catch onto the sandpaper and hold the legs in the desired position. Several ticks may be arranged on one piece of sandpaper as long as they do not overlap. Practice and experience is the best guide. Then place another strip of sandpaper over the ticks. On this place a strip of cotton, and then a microscope slide. Carefully turn these over and add a strip of cotton and a slide to the other side. Pick up the slides and wrap them with a rubber band. The cotton will act as a cushion but if the rubber band is stretched too tightly the ticks will be crushed flat and they will lose their natural shape. The slides are then set aside for several days until the ticks are thoroughly dried. At times tickets will stick to the sandpaper, but they can be released by bending the sandpaper slightly permitting the ticks to drop off. The legs of those specimens which were not thoroughly relaxed will sometimes curl up while drying but most specimens will be in the exact position in which they were placed.

By using Le Page's glue, or similar medium, the ticks may be mounted on insect pin points exposing either the dorsal or ventral aspects. Balsam slides may be prepared by soaking the ticks in xylol for a few minutes before embedding them or in toluene in preparing a clarite slide.

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## The Man who Stole Beetles

Systematists should take warning from the plight of a British entomologist whose sad case was reported recently in the London Daily Mail. Mr. Ephinstone Forest Gilmour of Shepherd's Bush, said by the Daily Mail to be a member of the Royal Society of Entomologists, found himself before a West London magistrate. Piled about in the court room were boxes containing hundreds of beetles—the physical evidence in the case. The result of the litigation was that the defendant received a sentence of three months for stealing beetles from the Natural History Museum in South Kensington.

The prosecution said that Mr. Gilmour had held a student's pass to the museum for two years. He was first suspected when the authorities read an article by him in an entomological magazine. In it he mentioned having in his collection a species of

beetle which the museum staff thought was unique in their own collection. Presumably this specimen was found to be missing, for Mr. Gilmour was placed under observation.

He was soon intercepted leaving the museum with 55 specimens. He said he was only borrowing them, but the court took a different view of the matter. The home of the defendant was then visited by Detective Inspector Jeffery, and 5,141 beetles were found which were identified as the property of the museum.

The moral of this episode might well be, that unrestrained enthusiasm may have dire consequences.—M.E.P.

## Reviews

ANT HILL ODYSSEY. By William M. Mann. 338 pp., illus. Atlantic-Little, Brown. Boston. 1948. Price: $3.50.

The present volume gives an account of Mann's boyhood and early manhood up until the time he took a position in the U. S. Government Service. Ordinarily such an account would interest only a small group of specialized readers, but this book has such a wealth of charm and wit that almost anyone, scientist or layman, who reads the first few pages will feel compelled to read on to the end of the book. Few naturalists, yes, even few soldiers of fortune, can look back on a more colorful life. Kind and generous, Mann has always had an unusual ability to get along with literally all kinds of people from primitive head hunters to erudite and world-renowned scientists. This understanding of human nature showed up in his early boyhood days in Montana, which, in many respects, are reminiscent of Tom Sawyer.

Mann's autobiography is literally one long collecting trip which was fortunately not too frequently interrupted and which ultimately reached out to many of the out-of-the-way places of the world. While still a very small boy in Montana he began collecting toads. Later, and in various parts of the United States, he collected insects, snakes and just about any other kind of animal that one can call to mind. There was, of course, the problem of preserving all of these specimens. Young Mann's solution to the problem in the case of the insects before he knew about pins was as follows: "I invented a process of putting corks from small bottles in the bottom of a cigar box and sticking them with chewing gum; to these I fastened my insect specimens, also with chewing gum (later I used glue), and during the spring made a small but to me fascinating collection." As time went on he learned about pins, but there were still many questions about the identity of the numerous specimens which were con-

stantly being collected. Thus the need of further education became apparent. The following quotation regarding the selection of a college shows Dr. Mann's delightful wit, which is apparent in his conversations as well as in his writing: "It seemed to me that a year in entomology under a teacher would give me a better understanding of labial palpi, trochanters, and scutelli. A heavy correspondence followed, chiefly in regard to college catalogues, some of which were confusing, but I did learn that Harvard University was not in New Haven, Connecticut, where I had written.

"Then came a copy of the magazine, *The Canadian Entomologist*, and in it was an article entitled 'The Hypopygium of the Tipulidae.' I had to look up the words to see what they meant. The article had been written by Professor Rennie Wilbur Doane of the State College of Washington, and it seemed certain that anybody who could write an article with a title like that would be a good one to explain the things I wanted to know. His college, at Pullman, was the one I selected, though I did not tell my mother the exact reason for going there rather than to some place nearer home."

His formal education at Washington State College, at Stanford and later at Harvard under the famous William Morton Wheeler gave young Mann a broad basis for his later studies of the animals collected in Brazil, Haiti, Mexico, Arabia and various Pacific Islands, and fitted him admirably for his government work in entomology and in the Zoo.

If there is any one group for which this intriguing book will have a special appeal, it is the myrmecologist and the student of myrmecophiles. For throughout the book, Dr. Mann has included many interesting accounts of his own special little animals, the ants and their guests. For those already conversant with his many technical papers on this subject, new and interesting sidelights await them.

For my part, I find only one thing wrong with the book: there is not enough of it. It is certainly to be hoped that Dr. Mann will write further about his many adventures, collecting trips, and friends not mentioned in the present volume.—M. W. WING.

A CATALOGUE OF INSECTICIDES AND FUNGICIDES. VOLUME II: CHEMICAL FUNGICIDES AND PLANT INSECTICIDES. By Donald E. H. Frear. Pp. xii + 154, super roy. oct., Waltham, Mass. 1948: The Chronica Botanica Co.; New York City: Stechert-Hafner, Inc. Price: $5.50.

The first part of this catalogue was devoted to chemical insecticides (Ent. News, 59: 55). In the present volume, Dr. Frear presents a list of the chemical fungicides arranged, as were the chemical insecticides, in a code system that places compounds that are chemically related near each other in the list. Then follow shorter lists of condensation products, of plant product fungicides and of miscellaneous fungicides. The second half of this volume is taken up by the long list of plant insecticides that have been tested, arranged alphabetically. The indexes include a reference and author index, a numerical patent list and, finally, a complete alphabetical index of all the chemical compounds that are mentioned in both volumes. The book is embellished by a frontispiece of Millardet, the discoverer of Bordeaux mixture, and by a number of vignettes of insects and plants reproduced from old sources.

We cannot but express our gratitude to the Chronica Botanica Co. for demonstrating that even such a book as this, filled as it is with long lists of dry data, by the selection of the right paper, type, format, by a very few vignettes and by careful make-up can be made to afford the user a degree of esthetic pleasure along with the scientific information.—R. G. SCHMIEDER.

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# Current Entomological Literature

## COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

**GENERAL—Borodin, D. N.**—Nicholas J. Kuznezov (1873–1948). (Biogr. sketch and bibliogr.) [Lep. News] 3: 29–34. **Ferguson and Jones**—A survey of the shore-line fauna of the Norfolk Peninsula. [1] 41: 436–46. **Keen, F. P.**—Notes on some forest insects of Baja California. [60]

8: 92–93. **Michener, C. D.**—Parallelisms in the evolution of the saturniid moths. [100] 3: 129–41. **Mickel, C. E.**—The classification of insects. [5] 42: 1–6. **Molitor, A.**—Experiments on the colony foundation of European ants. [45] 57: 101–08. **Noland, Lilly and Baumann**—A laboratory method for rearing cockroaches, and its application to dietary studies on the German roach. [5] 42: 63–70. **Park, O., S. Auerbach and M. Wilson**—Pselaphid beetles of an Illinois prairie. The fauna and its relation to the prairie peninsula hypothesis. [Bull. Chicago Acad. Sci.] 8: 268–76, ill.

**ANATOMY, PHYSIOLOGY, MEDICAL—Basu, A. C.**—Experiments on the pupa formation of Prodemia litura (Noctu.), a pest of cauliflower in West Bengal. [Proc. Zool. Soc. Bengal] 2: 73–79. **Bateman, A. J.**—Analysis of data on sexual isolation. [100] 3: 174–77. **Beard, R. L.**—Physiological effects of induced hemorrhage in Japanese beetle larvae. [45] 57: 79–91. **Bodine and Fitzgerald**—The formation of a complex between certain respiratory inhibitors and copper (in Melanoplus differentialis). [105] 33: 215–21. **Bohart, G. E.**—Record of a fungous outbreak among adult bees of the genus Andrena. [60] 8: 82. **Cook, E. F.**—The evolution of the head in the larvae of the Diptera. [50] 14: 1–57. **Dinnik and Zumpt**—The integumentary sense organs of the larvae of Rhipicephalinae (Acarina). [73] 56: 1–17. **Fitzgerald, L. R.**—The alkaline phophatase of the developing grasshopper egg. [41] 110: 461–87. **Frick, K. E.**—The biology of Microvelia capitata in the Panama Canal Zone and its role as a predator on anopheline larvae (Veli.). [5] 42: 77–100. **Friese, H.**—Über die Riesenformen der Männchen bei der Sandbiene (Andrena). [Ent. Tidsk., Stockholm] 70: 106–08. **Frigs, H. and M.**—The loci of contact chemoreceptors in insects. [1] 41: 602–58. **Hallenbeck, C.**—Insect thermometers. [56] 58: 256–59, ill. **Hovanitz, W.**—Interspecific matings between Colias eurytheme and C. philodice in wild populations. [100] 3: 170–73. **Jaynes and Speers**—Biological and ecological studies of the spruce budworm. [37] 42: 221–25. **Kühn, A.**—Über die Determination der Form—Struktur—und Pigmentbildung der Schuppen bei Ephestia kühniella. [Roux' Archiv] 143: 408–87. **Laidlaw, H. H., Jr.**—Development of precision instruments for artificial insemination of queen bees. [37] 42: 254–61. **Maas, A.-H.**—Über die Auslösbarkeit von Temperaturemodifikationen während

der Embryonalentwicklung von Drosophila melanogaster. [Roux' Archiv] 143: 515–72. **Moore, H. W.**—Variations in fall embryological development of three grasshopper species. [23] 80: 83–88. **Mukerji, D. and P. K. Mitra**—Ecology of the mound-building termite, Odontotermes redemanni, in relation to measure of control. [Proc. Zool. Soc. Bengal] 2: 9–27. **Pacaud, A.**—Relations topographique et signification fonctionelle de la localization du glycogene dans le mesenteron des larves de Simulium (Dipt.) au dernier stade. [C. R. Acad. Sci., Paris] 228: 1664–65. **Possompes, B.**—Ablation fractionnee de l'anneau de Weismann chez la larve de Calliphora erythrocephala. [C. R. Acad. Sci., Paris] 228: 1527–29. **Ray Chaudhuri, S. P. and J. Das Gupta**—Cytological studies on the Indian dragonflies. I. Structure and behaviour of the chromosomes in six species of dragonflies (Odonata). [Proc. Zol. Soc. Bengal] 2: 81–93. **Richards, A. G.**—Studies on arthropod cuticle. III. The chitin of Limulus (Crust.). [80] 109(2841): 591–92. **Richards and Fan**—Studies on Arthropod cuticle. V. The variation in permeability of larval cuticles of the blowfly, Phormia regina. [105] 33: 177–98. **Smith and Douglas**—An insect respirometer. [5] 42: 14–18. **Steinhaus, E. A.**—Insect pathology: The field concerned, training required and opportunities possible. [23] 81: 53–57. **Strickland, E. H.**—Wohlfahrtia (Metopi.) myiasis of mink in Alberta. [23] 81: 58–60. **Tashiro and Schwardt**—Biology of the major species of horse flies of central New York. [37] 42: 269–72. **Toth, L.**—Nitrogen-binding by Kalotermes flavicollis. (Isoptera) and its symbionts. [Hungarica Acta Biol., Budapest] 1: 22–29. **Tuxen, S. L.**—The hot springs, their animal communities and their zoogeographical significance. [Zool. of Iceland] 1(11): 1–206, ill, 1944. **Wellinston, W. G.**—The light reactions of the spruce budworm Choristoreura fumiferana (Tortrie). [23] 80: 56–82. **Williams, C. M.**—Extrinsic control of morphogenesis as illustrated in the metamorphosis of insects. [Growth] 12 (Supplement) 61–74. **Wishart, G.**—The biology of Melanichneumon tubicundus (Ichneumon.). [23] 80: 118–38.

**ARACHNIDA AND MYRIOPODA—Baker, E. W.**—Paratydeidae, a new family of mites. [65] 51: 119–22. **Bryant, E. B.**—The male of Prodidomus rufus (Araneae). [73] 56: 22–25. **Cunliffe, F.**—Pimeliaphilus isometri, a new scorpion parasite from Manila, P. I. (Pterygosom.). [65] 51: 123–29. **Dinnik and Zumpt**—(See under Anatomy.)

**Hoff, C. C.**—Wyochernes hutsoni, a new genus and species of chernetid pseudoscorpion. [84] 68: 40–48. **Hoffman, R. L.**—Nine new xystodesmid millipeds from Virginia and West Virginia, with records of established species. [71] 99 (3244): 371–89. **Janetzschek, H.**—Zur Brutbiologie von Neobisium jugorum (Arach., Pseudoscorpiones). [Ann. Naturhist. Mus., Wien] 56: 309–16, ill., 1948. **Nesbitt, H. H.**—Six new Mexican mites of the subfamily Rhizoglyphida. [60] 8: 57–70, ill. **Tuxen, S. L.**—Tardigrada. [Zool. of Iceland] 3 (24): 1–11, 1941. Myriopoda. *Ibid.* 3(36): 1–9, 1941.

**SMALLER ORDERS—Crystal, M. M.**—A descriptive study of the life history stages of the dog biting louse, Trichodectes canis (Mallo. Trichodect.). [18] 44: 89–97. **Denning, D. G.**—A review of the Rhyacophilidae (Trichop.). [23] 80: 97–117. **Eads and Menzies**—Meringis bilsingi, a new ectoparasite of the kangaroo rat, Dipodoznys ordii (Siphon. Hystrichopsyll.). [65] 51: 116–18. **Fristrup, B.**—Neuroptera and Trichoptera. [Zool. of Iceland] 3(43–44): 1–23, 1942. **Grensted, L. W.**—Some questions of nomenclature in the Odonata. [28] 85: 134–35. **Mac Swain, J. W.**—A method of collecting male stylops (Strepsiptera). [60] 8: 89–91. **Mukerji, D. and P. K. Mitra**—(See under Anatomy.) **Overgaard, C.**—Mallophaga and Anoplura. [Zool. of Iceland] 3(42): 1–22, 1942. **Park, O.**—A notable aggregation of Collembola. [5] 42: 7–9. **Ray Chaudhuri, S. P. and J. Das Gupta**—(See under Anatomy.) **Rehn, J. A. G.**—Dermaptera records from the Solomon, New Hebrides and Loyalty Islands. [83] 74: 159–63. Dermaptera records from various Pacific Is. *Ibid.*: 165–71 (*). **Teale, E. W.**—Fish-fly (Neuropt.). [56] 58: 274–75. **Toth, L.**—(See under Anatomy.)

**ORTHOPTERA—Bodine and Fitzgerald**—(See under Anatomy.) **Fitzgerald, L. R.**—(See under Anatomy.) **Hallenbeck, C.**—(See under Anatomy.) **Hetriek, L. A.**—The oviposition of the two-striped walking stick, Anisomorpha buprestoides (Phasmid.). [65] 51: 103–04. **Moore, H. W.**—(See under Anatomy.) **Noland, Lilly and Baumann**—(See under Anatomy.) **Paul and Berg**—An outbreak of Aeropedellus clavatus (Acrid.). [23] 80: 174–75. **Stroud and Strohecker**—Notes on White Sands Gryllacrididae. [65] 51: 125–26.

**HEMIPTERA—DeLong, D. M.**—A new name for a species of Scaphoideus previously placed under the name

luteolus. [58] 49: 83–84. **Frick, K. E.**—(See under Anatomy.) **Fristrup, B.**—Heteroptera and Homoptera Auchenorhyncha. [Zool. of Iceland] 3(51): 1–21, 1945. **Hottes, F. C.**—Notes on a little known work of Ph. F. Gmelin published in 1758 wherein he describes some new species of Aphis. [60] 8: 83–87. **Qadri, M. A. H.**—On the digestive system and the skeleto-muscular structures of the head capsule in the mango-hoppers, Idiocerus niveosparsus and I. clypealis (Homo. Jass.). [Proc. Zool. Soc. Bengal] 2: 43–55.

**LEPIDOPTERA—Basu, A. C.**—(See under Anatomy.) **Borodin, D. N.**—(See under General.) **Bourgoyne, J.**—Observations sur l'instinct des chenilles de Psychidae. [108] 54: 49–52. **Chermock, R. L.**—The new satyrids from North America. [23] 80: 172–73. **Darlington, E. P.**—Notes on some North American Lepidoptera reared on sweet fern (Comptonia asplenifolia) with description of new species. [83] 74: 173–85, ill. **Hovanitz, W.**—(See under Anatomy.) **Jaynes and Speers**—(See under Anatomy.) **Kühn, A.**—(See under Anatomy.) **Michener, C. D.**—(See under Anatomy.) **Rawson, G. W.**—A migration of the snout butterfly (Libytheana bachmanni) in eastern Arizona. [Lep. News] 3: 23. **Tilden, J. W.**—Occurrences of diurnal Lepidoptera at light. [60] 8: 94–96. **Wellinston, W. G.**—(See under Anatomy.) **Wilkes, Coppel and Mathers**—Notes of the insect parasites of the spruce bud worm Choristoneura fumiferana in British Columbia. [23] 80: 138–55. **Williams, C. M.**—(See under Anatomy.)

**DIPTERA—Abdel-Malek, A.**—A study of the morphology of the immature stages of Aedes trivittatus (Culic.). [5] 42: 19–37. **Alexander, C. P.**—New species of crane-flies from South America. Part XIII (Tipul.). [5] 42: 101–19. New or insufficiently known crane-flies from the Nearctic region. Part X. [18] 44: 98–104. New Nearctic crane-flies. [23] 80: 166–71. **Bateman, A. J.**—(See under Anatomy.) **Berry and Parker**—(See under Coleoptera.) **Breland, O. P.**—The biology and the immature stages of the mosquito, Megarhinus septentrionalis. [5] 42: 38–47. Distinctive features of the larvae of Aedes alleni. [45] 57: 93–100. **Colles, D. H.**—The anopheline mosquitoes of north-west Borneo. [Proc. Linnaean Soc.] 73: 71–119, 1948. **Cook, E. F.**—(See under Anatomy.) **Cresson, E. T., Jr.**—A systematic annotated arrangement of the genera and species of the North American Ephydridae. [83] 74:

225–60 (k*). **Frick, K. E.**—(See under Anatomy.) **Hull, F. M.**—Some flies of the Genus Volucella from the New World (Syrph.). [73] 56: 26–40 (*). **Hull, F. M.**—American syrphid flies of the subfamilies Cheilosinae or Sysphinae. [18] 44: 73–79 (*). **James, M. T.**—Some new and poorly known Therevidae from Colorado. [5] 42: 10–13 (k*). **Komp, W. H. W.**—Aedes (Ochlerotatus) nubilus Theobald, 1903, a synonym of A. (O.) serratus (Culic.). [65] 51: 105–14. **Lange, W. H., Jr.**—Notes on the occurrence of Agromyzid flies during 1948, and a record of two unreported species in California. [60] 8: 91–92. **Leclercq, M.**—Observations ecologique sur les mouches de nos habitations. [Rev. Franc. d'Ent.] 16: 46–49. **Maas, A.-H.**—(See under Anatomy.) **Mimeur, J. M.**—Contribution à étude des Zoocécidies du Marac. [Encyclop. Ent., Paris] 24: 3–259, ill. **Pacaud, A.**—(See under Anatomy.) **Quisenberry, B. F.**—The genus Oxyna in the Nearctic region north of Mexico. [60] 8: 71–76 (*), ill. **Richards and Fan**—(See under Anatomy.) **Spiess, E. B.**—Drosophila in New England. [45] 57: 117–31. **Stone, A.**—Deuterophlebia coloradensis in Oregon (Deuterophlebi). [65] 51: 122. **Strickland, E. H.**—(See under Anatomy.) **Tashiro and Schwardt**—(See under Anatomy.)

**COLEOPTERA—Balfour-Browne, J.**—The aquatic coleoptera of Newfoundland and Nova Scotia. [23] 80: 156–65 (*). **Beard, R. L.**—(See under Anatomy.) **Berry and Parker**—Investigations on a South American Epilachna sp. and the importation of its parasite Lydinolydella metallica into the United States (Coccinell. Larvaevor.). [65] 51: 93–103. **Cartwright, O. L.**—The American species of Pleurophorus (Scarab.). [83] 74: 131–45 (k*). Atoenius strigatus and allied species in the United States. *Ibid.:* 147–153 (k*). **Davies, R. G.**—The biology of Laemophloeus minutus (Cucuj.). [19] 40: 63–82. **Hatch, M. H.**—Studies on the Coleoptera of the Pacific northwest III: Carabidae: Harpalinae. [18] 44: 80–88 (*). **Hocking, B.**—Hornia minutipennis a new record and some notes on behaviour (Meloi.). [23] 81: 61–66. **Leech, H. B.**—Some nearctic species of hybradephagid water beetles, new and old. [23] 80: 89–96. **Malkin, B.**—Notes on Oregon Coccinellidae. [45] 57: 133–34. Observation on the courtship of Brenthis archorago (Brenth.). *Ibid.:* 135–37. **Marshall, M. Y.**—Studies in the Malachiidae II. [27] 28: 113–44 (k*). **McKeown, K. C.**—Catalogue of the Cerambycidae of Aus-

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**HYMENOPTERA—Bohart, G. E.**—New North American bees of the genus Dufoutea (Halict.). [5] 42: 55–62. (Also see under Anatomy.) **Brown, W. L., Jr.**—Synonymic and other notes on Formicidae. [73] 56: 41–49. **Cockerell, T. D. A.**—Bees from Central America, principally Honduras. [71] 98 (3233): 429–40 (k*). **Cole, A. C.**—A study of the genus Gesomyrmex, and a description of a species new to the genus (Formic.). [5] 42: 71–76 (k). **Doutt, R. L.**—The genus Erythmelus in California (Mymarid). [60] 8: 77–82 (k). **Fahringer, J.**—Opuscula braconologia (Subfamily Cenocoeliinae). [Ann. Naturhist. Mus., Wien] 56: 569–75, 1948. **Friese, H.**—(See under Anatomy.) **Fullaway, D. T.**—A new species of Opius from the Philippine Islands (Bracon.). [65] 51: 114–15. **Krombein, K.**—A new subspecies of Pterombrus rufiventris. [60] 8: 88–89. **Laidlaw, H. H., Jr.**—(See under Anatomy.) **Larsson, S. G.**—Myrer (Formicidae). [Danmarks Fauna] 49: 1–190, ill., 1943. **Milliron, H. E.**—Taxonomic and biological investigations in the genus Megastigmus (Callimom.). [1] 41: 257–420 (k*). **Molitor, A.**—(See under General.) **Scullen, H. A.**—Identification of Cerceris clypeata. [60] 8: 70. **Smith, M. R.**—On the status of Cryptocenus Latreille and Cephalotes Latreille (Formic.). [73] 56: 18–21 (*). **Townes, H.**—The nearctic species of the family Stephanidae. [71] 99(3243): 361–70 (k*). **Wesson, L. G., Jr.**—Strumigenys venatrix synonymous with S. talpa. [73] 56: 21. **Wilkes, Coppel and Mathers**—(See under Lepidoptera.) **Wishart, G.**—(See under Anatomy.)

## List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

1. American Midland Naturalist. Notre Dame, Indiana.
2. American Museum Novitates. New York, N. Y.
3. American Naturalist. Garrison-on-Hudson, New York.
4. Annals of Applied Biology. London.
5. Annals of the Entomological Society of America. Columbus, Ohio.
6. Annals and Magazine of Natural History. London.
7. Annales Academia Brasileira Sciencias. Rio de Janeiro.
8. Anales del Instituto de Biologia Mexico. Mexico City.
9. Anatomical Record. Philadelphia.
10. Arkiv för Zoologie. K. Svenska Vetenkapsakademien i. Stockholm.
11. Arquivos de Higiene e Saude Publica. São Paulo.
12. Biological Bulletin. Woods Hole, Massachusetts.
13. Bios, Rivista Biol. Geneva.
14. Boletin de Entomologia Venezolana. Caracas.
15. Boletin del Museo de Historia Natural "Javier Prado." Lima, Peru.
16. Boletin do Museu Nacional do Rio de Janeiro. Brasil.
17. Bull. Acad. Sci. (Izvestia Akad. nauk) U S S R (S. biol.).
18. Bulletin of the Brooklyn Entomological Society. New York.
19. Bulletin of Entomological Research. London.
20. Bulletin of the Museum of Comparative Zoology. Cambridge, Mass.
21. Bulletin of the Southern California Acad. of Sciences. Los Angeles.
22. C. r. Acad. Sci. (Doklady Akad. nauk) U S S R. Leningrad.
23. Canadian Entomologist. Guelph, Canada.
24. Canadian Journal of Research. Ottawa, Canada.
25. Ecological Monographs. Durham, North Carolina.
26. Ecology. Durham, North Carolina.
27. Entomologica Americana. Brooklyn Ent. Society, New York.
28. Entomological Monthly Magazine. London.
29. Entomological Record and Journal of Variations. London.
30. The Entomologist. London.
31. Florida Entomologist. Gainesville, Florida.
32. Frontiers. Philadelphia, Pennsylvania.
33. Great Basin Naturalist. Provo, Utah.
34. Iowa State College Journal of Science. Ames, Iowa.
35. Journal of Agricultural Research. Washington, D. C.
36. Journal of Animal Ecology. London.
37. Journal of Economic Entomology. Geneva, New York.
38. Journal of the Elisha Mitchell Science Society. Chapel Hill, N. C.
39. Journal of Entomology and Zoology. Claremont, California.
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50. Microentomology. Stanford University, California.
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53. Nature. London.
54. Nature. Washington, D. C.
55. La Naturaliste Canadien. Quebec.
56. Natural History. New York.

57. Occasional Papers, Mus. of Zool., Univ. of Michigan. Ann Arbor.
58. Ohio Journal of Science. Columbus, Ohio.
59. Opinions and Declarations. Intern. Com. Zool. Nomencl. London.
60. Pan-Pacific Entomologist. San Francisco, California.
61. Parasitology. London.
62. Proceedings of the Academy of Natural Sciences. Philadelphia.
63. Proceedings of the Biological Society of Washington. Washington, D. C.
64. Proceedings of the California Academy of Science. San Francisco.
65. Proceedings of the Entom. Soc. of Washington. Washington, D. C.
66. Proceedings of the Hawaiian Entomological Society. Honolulu.
67. Proceedings of the National Acad. of Sciences. Washington, D. C.
68. Proceedings of the Royal Entomological Society of London. Ser. A.
69. Proceedings of the Royal Entomological Society of London. Ser. B.
70. Proceedings of the Royal Entomological Society of London. Ser. C.
71. Proceedings of the U. S. National Museum. Washington, D. C.
72. Proceedings of the Zoological Society of London. London.
73. Psyche, A Journal of Entomology. Boston, Massachusetts.
74. Quarterly Journal of Microscopical Science. London.
75. Quarterly Review of Biology. Baltimore, Maryland.
76. Revista Academia Columbiana de Cien Exact. Fis. y Nat. Bogotá.
77. Revista Chilena de Historia Natural. Valparaiso, Chile.
78. Revista Instituto Salubridad y Enfermedades Tropicales. Mexico.
79. Revista Sociedad Mexicana de Historia Natural. Mexico City.
80. Science. Washington, D. C.
81. Scientific Monthly. New York.
82. Smithsonian Miscellaneous Collections. Washington, D. C.
83. Transactions of the American Entomological Society. Philadelphia.
84. Transactions of the Amer. Micros. Soc. Menasha, Wisconsin.
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91. University of California Publications in Entomology. Berkeley.
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94. Ward's Natural Science Bulletin. Rochester, New York.
95. Zoologica. New York.
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98. Annals of Tropical Medicine and Parasitology. Liverpool.
99. Canadian Journal of Research. Section E, Medical Sciences, Ottawa.
100. Evolution. New York.
101. Mitteilungen der schweitzerischen entomologischen Gesellschaft, Bern.
102. Revue de Entomologie. Rio de Janeiro, Brasil.
103. Procedings of the Royal Society of London.
104. Anales de la Escuela Nacional de Ciencias Biologicas. Mexico.
105. Journal of Cellular and Comparative Physiology. Philadelphia.
106. Redia. Florence, Italy.
107. Annales de la Société Entomologique de France. Paris.
108. Bulletin de la Société Entomologique de France. Paris.
109. Notulae Naturae. Philadelphia.
110. L'Entomologiste. Paris.
111. Revista Brasiliera de Biologie. Rio de Janeiro.
112. Eos, Revista Española de Entomologia. Madrid.
113. Minist. de Agri. de la Nación, Inst. Sanidad Vegetal, Buenos Aires.

# EXCHANGES

**This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.**

**These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.**

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**Lepidoptera**—Large quantities of Plexippus, Colias, Cardui, Vanillae wanted for cash or exchange for tropical butterflies. G. MacBean, 710 Miller Rd., Sea Island, Vancouver, B. C.

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**Mallophaga** (on which immediate determination is not necessary) wanted for study and determination. R. L. Edwards, Dept. Biology, Harvard University, Cambridge 38, Mass.

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**Bombidae,** nearctic and neotropical, wanted for exchange, identification, or purchase. Will exchange in other groups for bumblebees. Barth Maina, Dept. Zool., Univ. of Chicago, Chicago 37, Ill.

**Saturnidae** of the world. Will purchase individual specimens or cocoons. F. E. Rutkowski, St. Bede College, Peru, Illinois, U. S. A.

**Butterflies** of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

**Wanted**—Proc. Ent. Soc. Phila., vols. 1-6; Proc. Cal. Acad. (Nat.) Sci., 1-7; Proc. Acad. Nat. Sci. Phila., 1-20; Trans. Amer. Ent. Soc., 1-10; Bull. Buff. Soc. Nat. Sci., 1-5; Psyche, 11, 13, 15; Ent. Amer. n.s., 7-26. C. F. dos Passos, Mendham, N. J.

**Miridae (Capsidae)**—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

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